

NON-PUBLIC?: N
ACCESSION #: 8906050266
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Yankee Nuclear Power Station, Rowe, MassachusettsPAGE: 1 OF 3

DOCKET NUMBER: 05000029

TITLE: Dropped Control Rods Result in Reactor Scram on Low Main Coolant Pressure

EVENT DATE: 04/23/89 LER #: 89-007-00 REPORT DATE: 05/23/89

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION 50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:

NAME: Russell A. Mellor, Technical Director TELEPHONE: 413-424-5261

COMPONENT FAILURE DESCRIPTION:

CAUSE: X SYSTEM: AA COMPONENT: CON MANUFACTURER: X999
REPORTABLE TO NPRDS: N

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT:

On 4/23/89 at 1830 hours, during normal steady state operation, (Mode 1, at 100 percent power) the Control Room Operator observed that Group C control rods could not be moved. The operating crew determined that the control rods' cam motor was inoperable. An electrician was called in. The electrician performing troubleshooting requested the control room operator withdraw the group one step for troubleshooting purposes. The cam motor and control rods appeared to operate properly while being pulled one step. Almost immediately the control room received indication of dropped rods. Within five to ten seconds after the rods dropped an automatic scram occurred as a result of low main coolant pressure. An Unusual Event was declared at 1910 hours and terminated at 1915 hours. NRC notification was made at 1938 hours.

A thorough investigation was conducted determine the cause of the dropped rods. The cause of the inoperable cam motor was attributed to a broken compression connector found on the motor's brake solenoid circuit. The connector was replaced in kind. No abnormalities were found during the inspection or testing of the control rods' circuits and components. Control

rod exercising was performed without abnormal indications. A root cause for this event could not be positively determined.

There was no adverse effect to the public health or safety as a result of this event.

END OF ABSTRACT

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At 1830 hours, on April 23, 1989, with the plant in Mode 1 at 100 percent power the Control Room Operator observed that the Group C control rods (the controlling group) EIIIS:AA! could not be moved in either direction. An initial evaluation of the situation by the Operating Crew determined that the cam motor, used to sequentially operate the Control Rod Drive Mechanism (CRDM) coils, did not operate. The control rods were considered operable since they were capable of performing their intended trip function. A Maintenance Request was initiated and a plant electrician was called in to investigate.

The electrician and a Supervisory Control Room Operator (SCRO) trainee went to the Switchgear Room and visually inspected the cam motor, brake and limit switch housing. The control room operator was requested to move Group C control rods one step to allow the operation of the cam motor to be observed. The Group C cam motor went through one complete cycle and stopped in the proper position. The sound monitoring equipment on the reactor head seemed to indicate that a complete cycle had taken place.

Almost immediately after the step out the "Power Range Loss of Power or Dropped Rod" panalarm was received. Control Room personnel observed that two of the four Group C control rods and dropped. Main coolant system EIIIS:AB! temperature and pressure began to decrease. At 1853 hours, within approximately five to ten seconds of the panalarm, the reactor system EIIIS:JE! initiated an automatic reactor scram as the result of a low main coolant pressure condition.

At 1910 hours, an Unusual Event was declared. The states of Massachusetts and Vermont were notified at 1923 and 1919 hours, respectively. The NRC was notified via the ENS at 1938 hours. The Unusual Event was terminated at 1915 hours.

A thorough investigation was conducted to determine the cause of the dropped rods. No abnormalities were found during the inspection or testing of the CRDM control circuits and components. The Group C rods' drive coils were megger tested with satisfactory results. Two problems were found in the brake solenoid circuit. First, the compression connector EIIIS:CON! on one end of

the wire supplying power to the solenoid to release the brake was broken.

This

problem caused the inoperable condition of the cam motor. The second problem was a bare spot in the insulation on one of the brake coil power wires. There were no signs of arcing and no grounds were reported, therefore, this is not suspected to have caused any problems. The insulation was repaired using a heat shrinkable insulating sleeve and the broken compression connector was replaced in kind. Following completion of the inspections and repair activities the control rods were satisfactorily exercised. The plant returned to power at 1515 hours on April 25, 1989.

During the investigation to determine the root cause of this event five possible reasons were evaluated.

1. The broken compression connector on the brake could have caused the

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brake to apply during the rod movement. This may have stalled the cam motor which then drew locked rotor current. A voltage drop may have been created in the rod group selection circuit which resulted in a reduction in the stationary gripped coil voltage. This then caused the stationary grippers to drop the rods.

2. The broken compression connector could have shorted (phase to phase) causing a voltage drop in the rod group selection circuit resulting in a reduction in the stationary gripped coil voltage. This then caused the stationary grippers to drop the rods.

3. At the time of the incident dirt could have been present on the stationary or movable gripper contractor contacts causing failure of the stationary or movable gripper to energize properly and therefore dropping the rods. The dirt may have been subsequently dislodged after cam motor movement.

4. The broken compression connector on the brake could have caused the brake to apply during the rod movement. This stalled or jerked the cam causing one of the contacts to momentarily open, thus causing either the stationary or movable gripper to release, dropping the rods.

5. Some dirt could have been present on one of the contacts in cam during the rod movement. This caused one of the contractors to fail to energize either the stationary or movable gripper coil, dropping the rods. The dirt may have been subsequently dislodged

after cam motor movement.

No conclusive evidence was found of phase to phase shorting or dirty contacts. Since no conclusive evidence could be found to substantiate one or more of the above possible reasons and the equipment and circuits tested satisfactorily, a root cause of the event could not be determined.

No other corrective actions are deemed necessary at this time. This is the first reported occurrence of this nature.

With exception of an automatic trip of the supply breaker for Motor Control Center 4, Bus 2, caused by a faulty overload unit, all systems performed as intended. There was no adverse effect on the public health or safety as a result of this event.

ATTACHMENT 1 TO 8906050266 PAGE 1 OF 1

YANKEE ATOMIC ELECTRIC COMPANY Telephone (413) 424-5261
Star Route, Rowe, Massachusetts 01367

May 23, 1989
BYR 89-94

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Subject: Licensee Event Report No. 50-29-89-07

Dropped Control Rods Results in Reactor Scram on Low Main Coolant Pressure

Dear Sir:

In accordance with 10 CFR 50.73(a)(2)(iv), the attached Licensee Event Report is hereby submitted.

Very truly yours,

Normand N. St. Laurent
Plant Superintendent

ELM/elm
Enclosure

cc: 3! NSARC Chairman (YAEC)

1! Institute of Nuclear Power Operations (INPO)
1! USNRC, Region I
1! Resident Inspector

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